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GROWTH IN UNDERSTOCKED AND OVERSTOCKED WESTERN WHITE PINE STANDS

Richard F. Watt
Division of Forest Management Research

Do understocked forest stands tend to approach full stocking? Do overstocked stands tend to approach normal? Foresters are faced with these two questions when using normal yield tables to predict the growth of understocked and overstocked stands. A study of data from 54 sample plots which were established in the western white pine type in 1925 and 1926 provides some answers to these questions. The results, although preliminary, appear to have considerable practical value.

The study showed that over a period of time, understocked and overstocked western white pine stands do tend to approach certain central values. However, these central values are not exactly the values given in the western white pine yield tables. 1/ For example, basal area stocking tends to approach 92 percent of the yield table volume. Scribner board-foot volume seems to be approaching 88 percent of normal volume and total cubic-foot volume 98 percent of normal. These percentages indicate that the white pine yield table values may be somewhat too high.

The table on the last page shows the average five-year changes which occur in stands of various original densities. For example, if a stand has 60 percent of normal Scribner board-foot volume, it should have 67 percent of normal Scribner board-foot volume five years later. In another five years, it should have 73 percent of normal volume. These percentages are computed as follows:

Original stocking in board feet (as determined by comparison with yield table values)	60	percent
Five-year change in board-foot stocking	+7	"
Stocking after five years	67	"
Second five-year change (read value opposite 65 percent in table)	+6	"
Stocking after ten years	73	"

1/ Haig, I. T. Second growth yield, stand and volume tables for the western white pine type. U.S.D.A. Tech. Bul. 323. 1932.

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The importance of considering changes in normality when making growth predictions is shown by the following example. A 60-year-old forest on site 50, with 60 percent of normal Scribner volume stocking, contains 3,960 board feet per acre. In ten years, this stand should, as shown above, contain 73 percent of the normal board-foot volume or about 8,980 board feet. If the prediction were made assuming no change in density, the predicted yield would be 7,380 board feet. The difference of 1,600 board feet between the two predicted yields is of practical significance and should not be disregarded.

The figures in the table can be applied only to large areas. The net growth on small areas was found to fluctuate so greatly due to erratic occurrence of mortality that growth predictions for small areas may easily be greatly in error. But, when large areas are considered, mortality, and thus net growth, tends to level off to a predictable average.

Five-year changes in normality of western white pine stands 1/

Normality at beginning of five-year period 2/	Five-year change in normality		
	Scribner board-foot volume	Cubic-foot volume	Basal area
Percent	Percent	Percent	Percent
40	+12	--	--
45	+11	--	--
50	+9	--	--
55	+8	--	--
60	+7	--	--
65	+6	--	--
70	+4	+5	--
75	+3	+4	--
80	+2	+3	+2
85	+1	+2	+1
90	0	+1	0
95	-2	0	0
100	-3	0	-1
105	-4	-1	-2
110	-5	-2	-3
115	-7	-3	-4
120	-8	-4	-5
125	-9	-5	-6
130	-10	-6	-6
135	-12	-7	-7
140	-13	-8	-8
145	-14	-8	-9
150	-15	-9	-10

1/ Values given in the table apply to all sites.

2/ Normality determination should be made with the same unit which is going to be predicted. For example, to predict changes in basal area, use normality percent calculated from basal area stocking; for board-foot changes, use normality percent computed from board-foot stocking.